

REMARKS

Claims 1-37 are in the instant application and are subject to restriction to one of the following inventions under 35 U.S.C. 121:

I. Claims 1-3, drawn to a cathode target sputter deposited film, classified in class 313, subclass 467.

II. Claims 4-36, drawn to coated article, classified in class 428, subclass 432.

III. Claim 37, drawn to a method of making a coated article, classified in class 65, subclass 54.

Applicants affirm the provincial election made with traverse by the undersigned on September 28, 2000, to prosecute the invention of Group II, claims 4-36.

Applicants respectfully traverse the restriction requirement; however, to eliminate this issue, claims 1-3 and 37 have been canceled without prejudice.

Claims 5, 11-14 and 18-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention.

The Office Action alleges that: claim 5 is indefinite because it is unclear regarding "the zinc oxide, tin oxide film", and claims 11-14 and 18-24 lack antecedent basis for "the coating stack" whereas claim 4 is drawn to an infrared reflective coating article.

Applicants respectfully traverse the rejection of claims 5, 11-14 and 18-24 under 35 U.S.C. 112, second paragraph; however, to eliminate this issue, claims 5, 11-14 and 18-24 have been amended to more positively point out and distinctly claim the embodiments of the invention recited in claims 5, 11-14 and 18-24. More particularly, claim 5 has been amended to recite that the electrical enhancing film is the zinc oxide, tin oxide film and the preamble of claims 11-14 and 18-24 is amended to recite --coated article--. Support for the amendments to claim 5, 11-14 and 18-24 is found, among other places, in the originally filed claims and specification.

Based on the foregoing, applicants respectfully request admittance of the amendments to; consideration of, and withdrawal of the rejection of claims 5, 11-14 and 18-24 under 35 U.S.C. 112, second paragraph.

Claims 4-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glaverbel Great Britain Patent No. 2,311,540 and Gillery U.S. Patent No. 4,610,771.

The Office Action alleges that Glaverbel discloses a coated sheet comprising a transparent substrate carrying two metal layers formed of silver or silver alloy and three layers of a transparent dielectric non-absorbent material (page 4, lines 13-24), that suitable non absorbent materials include oxides such as tin oxide and zinc oxide, nitrides such as silicon nitride or a mixture thereof or a complex of non-absorbent materials such as zinc stannate, that each complete non-absorbent layer can include more than one of these materials and each layer can be a composite layer formed of successive subsidiary layers of different composition from each other, for example a zinc oxide layer split into two or more sub-layers of another non absorbent material (page 7, lines 9-20). The Office Action continues by alleging that Glaverbel also discloses that a combination of tin oxide and zinc oxide is generally advantageous, whether in admixture or in successive sub-layers, that the coated substrate may further comprise a thin layer of sacrificial material provided above and in contact with each metal layer and that suitable sacrificial metals include titanium and zinc (page 7, lines 24-33).

The Office Action further alleges that regarding claims 34 and 35, as stated in page 1, lines 1-7, the coated transparent sheet is used for vehicle windows; that regarding claim 36, the reference discloses that the glass assembly comprises two or more laminated sheets (page 2, lines 13-21) and that regarding claim 24, Glaverbel discloses a laminated assembly where the metal layers have a thickness between 16.5-22 nm and the non-absorbent layers have a thickness between 220-260 nm (page 4, lines 32-36). The sacrificial layer has a thickness around 15 nm (page 7, lines 34-36).

The Office Action acknowledges that Glaverbel fails to disclose the exact thickness ranges for the layers and then alleges that it would have been obvious to one having ordinary skill in the art at the time the invention was made to select the disclosed ranges, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

The Office Action further acknowledges that Glaverbel fails to disclose the zinc stannate film has a composition of 10-90 weight % of zinc and 90-10 weight % of Tin and then alleges that Gillery discloses a film composition comprising multiple layers, preferably a highly reflective film such as gold, silver and copper sandwiched between metal oxide layers that the anti-reflection layer comprises a metal oxide, which is preferably zinc stannate (col. 3, lines 25-32) and that the zinc stannate film has a composition of preferably 10-90 percent zinc and 90-10 percent tin, where a zinc/tin ratio from 40:60 to 60:40 is preferred (col. 4, lines 2-7).

The Office Action concludes by alleging that at the time the invention was made it would have been obvious to someone of ordinary skill in the art to use the zinc stannate composition of Gillery to make Glaverbel zinc stannate film. The suggestion/motivation would have been to produce a higher transmittance film.

Applicants respectfully traverse the rejection of claims 4-36 under 35 U.S.C. 103(a) and request reconsideration thereof. Claims 5-24 are either directly or indirectly dependent on claim 4; claims 26 and 27 are either directly or indirectly dependent on claim 25; claims 29 and 30 are either directly or indirectly dependent on claim 28, and claims 32-36 are either directly or indirectly dependent on claim 31.

Claim 4 has been amended to recite that the first dielectric film includes additional materials. Support for the amendment to claim 4 is found, among other places, on page 4, lines 6-10. Claims 5-14 and 17-24 have been amended for among other reasons to overcome the rejection under 35 U.S.C. 112, second

paragraph, discussed above and/or to be consistent with amended claim 4 on which they are dependent.

Claim 25 is amended to align paragraphs; no wording in the claim has been changed. Claim 28 has been amended by inserting --and-- in the Markush grouping for purposes of clarity. Support for the amendment to claims 25 and 28 is found, among other places, in originally filed claim 28. Based on the foregoing, applicants respectfully request admittance and consideration of amended claims 4-14, 17-24, 25 and 28.

Applicants respectfully submit that there is no disclosure in Glaverbel of a dielectric layer having two films, one of which is an enhancing film of zinc oxide, tin oxide or zinc stannate. Glaverbel on page 7, lines 9-20, discloses layers made up of one or more films; however, there is no disclosure of using a zinc oxide, tin oxide film or a zinc stannate film as an enhancing film. Further, there is no disclosure in Glaverbel that two zinc stannate films having different compositions may be included in a dielectric layer and that one of the zinc stannate films is an enhancing film. The zinc oxide films and tin oxide films disclosed in Glaverbel are discreet films, not a combined film. Applicants on the other hand claim a film of zinc oxide, tin oxide (as disclosed in the disclosure).

Combining the disclosure of Gillery with Glaverbel does not cure the defects of the disclosure of Glaverbel discussed above. Gillery discloses a zinc stannate film but does not disclose a tin oxide, zinc oxide film nor a dielectric layer having two or more films.

Based on the foregoing, applicants respectfully request withdrawal of the rejection of claims 4-36 under 35 U.S.C. 103(a) and request allowance thereof.

Applicants by this amendment have added claims 38-43. Claim 38 is dependent on claim 5; claim 39 is dependent on claim 8; claim 40 is dependent on claim 11; claim 41 is dependent on claim 15; claim 42 is dependent on claim 17, and claim 43 is dependent on claim 22. The added claims in one form or another recite that the

first dielectric film of the first dielectric layer is the first zinc stannate film. Support for the added claims is found, among other places, in the originally filed claims. The arguments put forth to patentably distinguish claims 5, 8, 11, 15, 17 and 22 over the art are applicable, among others, to patentably distinguish claims 38-43 over similar art.

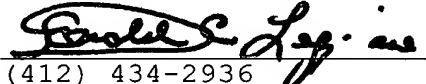
Based on the foregoing, applicants respectfully request admittance, consideration and allowance of claims 38-43.

This amendment represents a sincere effort to place the application in condition for allowance. In the event issues remain, the Examiner is invited to call the undersigned to discuss those issues before further action is taken on the case.

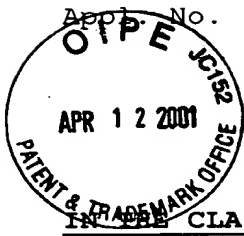
Attached hereto is a marked-up version of the amendments to the claims made by the instant amendment. The attached page is captioned **"VERSION WITH MARKINGS TO SHOW CHANGES MADE"**.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

Claims 1-3 and 37 have been canceled.

Claim 4-14, 17-25 and 28 have been amended as follows:

4. (amended) An infrared reflective coated article comprising:

- a substrate;
- a dielectric layer defined as a first dielectric layer sputter deposited over the substrate, the layer comprising a first dielectric film selected from the group consisting of zinc oxide, silicon oxide, tin oxide, silicon nitride, silicon oxynitrate and zinc stannate, ~~the zinc stannate film deposited over the substrate~~ having zinc in weight percent range of equal to and greater than 10 and equal to and less than 90, and tin in the weight percent range of equal to and less than 90 and equal to and greater than 10, wherein the zinc stannate film of the dielectric layer is defined as a first zinc stannate film and an electrical enhancing film deposited over the ~~zinc stannate~~ first dielectric film, the electrical enhancing film selected from the group of films consisting of zinc oxide, tin oxide film and a second zinc stannate film wherein the composition of the first zinc stannate film is at least about 5 weight percent different than the composition of the second zinc stannate film, and
- an infrared reflective layer deposited on the dielectric layer.

5. (amended) The coated article of claim 4 wherein the infrared reflective metal is silver and the ~~silver~~ electrical enhancing film is ~~deposited on the~~ zinc oxide, tin oxide film.

6. (amended) The coated article ~~stack~~ of claim 4 wherein the first dielectric film is the first zinc stannate film, the infrared reflective layer is a silver film and the ~~silver~~

electrical enhancing film is ~~deposited on~~ the second zinc stannate film.

7. (amended) The coated article ~~stack~~ of claim 4 wherein the ~~dielectric layer is a first dielectric layer and the~~ infrared reflective layer is a first infrared reflective layer and further including:

a metal primer layer over the first infrared reflective layer;

a second dielectric layer over the primer layer, and optionally a protective overcoat over the second dielectric layer.

8. (amended) The coated article of claim 7 wherein the second dielectric layer is a zinc stannate film having 10-90 weight percent zinc and 90-10 weight percent tin.

9. (amended) The coated article of claim 4 wherein ~~the dielectric layer is a first dielectric layer and the~~ infrared reflective layer is a first infrared reflective layer and further including:

a first metal primer layer over the first infrared reflective metal layer;

a second dielectric layer ~~including~~ over the first primer layer;

a second infrared reflective layer over the second dielectric layer;

a second metal primer layer over the second infrared reflective layer;

a third dielectric layer ~~including~~ over the second metal primer layer, and

optionally a protective film over the third dielectric layer.

10. (amended) The coated article of claim 9 wherein at least one of the second and third dielectric layers includes a zinc

stannate film having 10-90 weight percent zinc and 90-10 weight percent tin.

11. (amended) The ~~coating stack coated article~~ of claim 4 wherein the ~~dielectric layer is a first dielectric layer and the~~ infrared reflective layer is a first infrared reflective layer and further including:

a first metal primer layer over the first reflective layer;

a second dielectric layer over the first metal primer layer, the second dielectric layer comprising a first dielectric film and a zinc stannate film defined as a first zinc stannate film, the first zinc stannate film having zinc in the weight percent range of equal to and greater than 10 and equal to and less than 90 and tin in the weight percent range of equal to and greater than 10 and equal to and less than 90, the first dielectric layer film of the second dielectric layer deposited over the first metal primer layer;

a second infrared reflective layer deposited over the second dielectric layer;

a second metal primer layer deposited over the second infrared reflective layer;

a third dielectric layer deposited over the second primer layer₊ and

optionally a protective layer over the third dielectric layer.

12. (amended) The ~~coating stack coated article~~ of claim ~~11-40~~ wherein the first dielectric film of the second dielectric layer comprises a zinc oxide film; a zinc oxide, tin oxide film or a zinc stannate film defined as a second zinc stannate film, the second zinc stannate film of the second dielectric layer having a composition different than the composition of the first zinc stannate film of the second dielectric layer.

13. (amended) The ~~coating stack coated article~~ of claim 12 wherein the second zinc stannate film of the second dielectric

layer has zinc in the weight percent range of equal to and greater than 60 and equal to and less than 90 and tin in the weight percent of equal to and greater than 10 and equal to and less than 40, and the third dielectric layer is a zinc stannate film.

14. (amended) The ~~coating stack~~ coated article of claim 4 wherein ~~the dielectric layer is a first dielectric layer and the~~ infrared reflective layer is a first infrared reflective layer and further including:

a first metal primer layer over the first reflective layer;

a second dielectric layer over the first metal primer film;

a second infrared reflective layer over the second dielectric layer;

a second metal primer layer over the second infrared reflecting metal layer;

a third dielectric layer over the second metal primer layer, the third dielectric layer comprising a first dielectric film and a zinc stannate film defined as a first zinc stannate film, the first zinc stannate film having zinc in a weight percent with the range of equal to and greater than 10 and equal to and less than 90 and tin within the weight percent range of equal to and less than 90 and equal to and greater than 10, the third dielectric ~~film~~ layer deposited over the second metal primer; and

optionally a protective film overlying the third dielectric film.

17. (amended) The coated article of claim 4 wherein ~~the dielectric layer is a first dielectric layer and the~~ infrared reflective layer is a first infrared reflective layer and further including:

a first metal primer layer over the first reflective layer;

a second dielectric layer over the first metal primer layer, the second dielectric layer comprising a first dielectric

film and a zinc stannate film defined as a first zinc stannate film, the first zinc stannate film having zinc in a weight percent within the range of equal to and greater than 10 and equal to and less than 90 and tin within the weight percent range of equal to and less than 90 and equal to and greater than 10, the second dielectric layer deposited over the first metal primer layer;

a second infrared reflective layer over the first zinc stannate film of the second dielectric layer;

a second metal primer layer over the second infrared reflective layer;

a third dielectric layer over the second metal primer layer, the third dielectric layer comprising a first dielectric film and a zinc stannate film defined as a first zinc stannate film, the first zinc stannate film having zinc in a weight percent within the range of equal to and greater than 10 and equal to and less than 90 and tin within the weight percent range of equal to and less than 90 and equal to and greater than 10, the third dielectric layer deposited over the second metal primer layer; and

optionally a protective film overlying the first zinc stannate film of the dielectric layer.

18. (amended) The ~~coating-stack-coated article~~ of claim 17 wherein the first dielectric film of the second dielectric layer and the first dielectric film of the third dielectric layer each has a film selected from the group consisting of zinc oxide film; zinc oxide, tin oxide film ~~or~~ and second zinc stannate film having a composition different than the composition of the first zinc stannate film in the respective same second or third dielectric layer.

19. (amended) The ~~coating-stack-coated article~~ of claim 18 wherein the second zinc stannate film of the first and second dielectric ~~layer-layers~~ each include zinc in the weight percent range of equal to and greater than 60 and equal to and less than 90 and tin in the weight percent of equal to and greater than 10 and equal to and less than 40.

20. (amended) The ~~coating-stack-coated article~~ of claim 17 wherein the second dielectric layer further includes a third dielectric film over the first zinc stannate film of the second dielectric layer.

21. (amended) The ~~coating-stack-coated article~~ of claim 18 wherein the second dielectric layer further includes a third dielectric film over the first zinc stannate film of the second dielectric layer wherein the third dielectric film of the second dielectric layer is a film selected from the group consisting of zinc oxide film, zinc oxide, tin oxide film and a zinc stannate film defined as a third zinc stannate film, the third zinc stannate film has a composition different than the composition of the zinc stannate film of the second dielectric ~~layer-film~~ closest to the third zinc stannate film.

22. (amended) The ~~coating-coated article~~ of claim 18 wherein the second dielectric film of the second dielectric layer and the second dielectric film of the third dielectric ~~second-layer~~ each comprises a zinc oxide film; a zinc oxide, tin oxide film or a second zinc stannate film having a composition different than the composition of the first zinc stannate film of third dielectric layer.

23. (amended) The ~~coating-stack-coated article~~ of claim ~~22-43~~ wherein the first and third dielectric films of the second dielectric layer and the first dielectric film of the third dielectric layer each include zinc in the weight percent range of equal to and greater than 60 and equal to and less than 90 and tin in the weight percent of equal to and greater than 10 and equal to and less than 40.

24. (amended) The ~~coating-stack-coated article~~ of claim 20 wherein the first dielectric film of the first dielectric layer is the first zinc stannate film, the second zinc stannate film of

the first dielectric layer is on the glass piece and has a thickness in the range of 230 ± 40 Angstroms Å; the first zinc stannate film of the first dielectric layer is on the second zinc stannate film of the first dielectric layer and has a thickness in the range of 80 ± 40 Å; the first infrared reflective metal layer is a first silver film deposited on the first zinc stannate film of the first dielectric layer and has a thickness in the range of 110 ± 30 Å, the metal primer layer is a titanium film deposited on the first silver layer and has a thickness in the range of 17-26Å; the first dielectric film of the second dielectric layer is deposited on the titanium film and has a thickness in the range of 80 ± 40 Å; the first zinc stannate film of the second dielectric layer is deposited on the first dielectric film of the second dielectric layer and has a thickness in the range of 740 ± 40 Å; the second infrared reflective metal layer is a second silver film deposited on the second dielectric film of the second dielectric layer and has a thickness in the range of 110 ± 38 Å; the second primer film is a titanium film deposited on the second silver layer and having a thickness in the range of 18 - 31Å; the first dielectric film of the third dielectric layer is deposited on the second titanium film and has a thickness in the range of 80 ± 40 Å; the first zinc stannate layer of the third dielectric layer is deposited on the first dielectric film of the third dielectric layer and has a thickness in the range of 120 ± 40 Å, and the protective layer is a titanium metal film deposited on the first zinc stannate layer of the third dielectric layer and has a thickness in the range of 29 ± 3 Å.

25. (amended) A coated article comprising:
- a substrate;
 - a first dielectric layer over the substrate;
 - a first infrared reflective layer over the first dielectric layer;
 - a first metal primer layer over the first infrared reflective layer;

_____ a second dielectric layer over the first metal primer, the second dielectric layer having a first dielectric film selected from the group consisting of zinc oxide, tin oxide film and a first zinc stannate film, and a second dielectric film the second dielectric film having a composition different than the first dielectric film of the second dielectric layer;

a second infrared reflective layer over the second dielectric layer;

a second primer layer over the second reflective layer;

a third dielectric layer over the second metal primer layer; and

optionally a protective layer overlying the third dielectric layer.

28. (amended) A coated article comprising:

a substrate;

a first dielectric layer over the substrate;

a first infrared reflective layer over the first dielectric layer;

a first metal primer layer over the first infrared reflective layer;

a second dielectric layer over the first metal primer layer;

a second infrared reflective layer over the second dielectric layer;

a second metal primer layer over the second reflective metal layer;

a third dielectric layer having a first dielectric film selected from the group consisting of zinc oxide film; zinc oxide, tin oxide film, and a first zinc stannate film and a second dielectric film overlying the first dielectric film, the second dielectric film having a composition different from the first dielectric film; and

optionally a protective film overlying the third dielectric layer.

Claims 38-43 have been added as follows:

38. The coated article of claim 5 wherein the first dielectric film of the first dielectric layer is the first zinc stannate film.

39. The coated article of claim 8 wherein the first dielectric film of the first dielectric layer is the first zinc stannate film.

40. The coated article of claim 11 wherein the first dielectric film of the first dielectric layer is the first zinc stannate film.

41. The coated article of claim 15 wherein the first dielectric film of the first dielectric layer is the first zinc stannate film.

42. The coated article of claim 17 wherein the first dielectric film of the first dielectric layer is the first zinc stannate film.

43. The coated article of claim 22 wherein the first dielectric film of the first dielectric layer is the first zinc stannate film.